

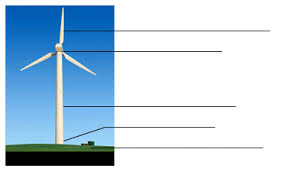
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| --- | --- |
| **Grade Level:** 3rd /4th Grade | **Date**: November 4, 2017 |
| **Subject:** Science  This lesson will focus on how wind energy can be generated. Students will engage in activities that will explore the growing use of wind energy. They will design a structure out of ever day items and reflect on process with team member. All activities will be modified to meet the needs of all learners. (Additional support will be provided throughout the lesson). | **Standards**:  Obtain and combine information about ways individual communities use science ideas to protect Earth’s resources and environment.  Apply scientific ideas to design, test and refine a device that converts energy form one form to another.  Define a simple design project that includes specified criteria for success and constraints on materials. |
| **Vocabulary:**  **wind turbine**  **renewable energy**  **torque** | **Goals/Objectives**:  Students will learn about wind energy and wind turbine. Students will learn how to construct and design a project. Students will learn about teamwork and problem solving. |
| **Activity/Procedure**:  **Part 1:**  Students will be shown on the Smartboard pictures of a wind turbine. They will be asked to share with their partner how is this connected to wind energy. Students will also reflect on whether or not if this would be renewable or nonrenewable resource. Teacher will then explain what is a wind turbine and then show a BrainPOP video featuring wind energy. After video, students will have an opportunity to take quiz about the video (if time permits).  **Part2:**  Students will work with partners in different stations. Students will be assigned to a station for at least 20-25 minutes. Each activity will require students to work on a task related to the topic, wind energy.  **Part 3:**  Students will be selected to share work with the class and complete an exit slip and windmill project reflection sheet. | **Materials/Supplies/Resources**:  SmartBoard  BrainPOP Video/Quiz  Graphic Organizer Y Chart **(Station 1)**  Label Turbine/Fill in the blank/Short Answer Response Question **(Station 2)**  Create a Windmill **(Station 3)**  (fan, straws, craft sticks, paper, scissors, tape, paper clips, index cards, plastic cups)  Reflection Sheet  Exit Slip  Project Rubric |

**Station 1 Activity (BrainPOP)**

**Graphic Organizer**

|  |
| --- |
| **Y Chart Describe how a turbine converts wind into electricity**  **1. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**  **2.\_\_\_\_\_\_\_\_\_\_\_\_\_\_ 3.\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_** |

**Station 3 BrainPOP Activity Sheet**

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**Label the wind turbine.**

**Use the words below.**

**ground level**

**tower**

**generator**

**rotor blade**

**transformer**

**Fill in the blanks.**

1. Wind turbines convert the wind’s energy into rotational energy called\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

2. A place with lots of turbines working together is a wind\_\_\_\_\_\_\_\_\_\_\_\_.

3. Wind energy is a \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ energy source, unlike oil and fossil fuels.

4. About\_\_\_\_\_\_\_\_\_\_\_\_ percent of America’s power is generated by the wind.

Write a response.

Should the U.S. and other countries use more wind energy? Why or Why not?

**\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

**Station 3**

**Create a Working Windmill**

**With partner create a working windmill by following these rules:**

**You must use materials provided.**

**The windmill must be constructed on top of the table.**

**You must build a windmill that uses the most energy (fastest rotation).**

**Windmill must be free standing.**

**Materials**

**Straws**

**Craft Sticks**

**Paper**

**Scissors/Tape**

**Paper Clip**

**Index cards**

**Plastic Cups**

**Windmill Reflection Sheet**

**1. Were you successful in this challenge? Why or Why not?**

**2. What was the most difficult part of this challenge? Why?**

**3. What did you learn about the construction process of your windmill?**

**4. If you had to do it over again, how would your planned design change? Why?**

**EXIT SLIP**

**TOPIC YOU LEARNED:**

**WHAT I LEARNED TODAY:**

**I WONDER:**

**NEXT TIME:**

**Project Rubric**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Category** | **4** | **3** | **2** | **1** |
| **Plans** | **Plan is neat with clear measurements and all parts can be identified** | **Plan is neat with some clear measurements and most parts can be identified** | **Plan provides measurements and some parts can be identified.** | **Plan does not show measurements and parts are not identified** |
| **Construction** | **Appropriate materials were used and creatively used to make project better.** | **Appropriate materials were used and some creativity used to make project better.** | **Appropriate materials selected.** | **Inappropriate materials used and contributed to project performing poorly.** |
| **Function** | **Structure functions performed extremely well holding up under (fan) and other stresses.** | **Structure functions performed well holding up under (fan) and other stresses.** | **Structure function performed well but began to deteriorate under (fan) and other stresses.** | **Flaws in function and outcome.** |